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Meadowland Warfare

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THEY SWAT A BILLION MOSQUITOES A SUMMER



Bergen County Mosquito Commission employees spray flooded meadows in Lyndhurst. Boat driven by airplane propeller is used to reach breeding spots.

By JOHN T. CUNNINGHAM

DR. THOMAS J. HEADLEE of Rutgers University, one of New Jersey's pioneers in mosquito control and therefore no stranger to those blood-thirsty insects, found even his credibility tested one summer night in 1914 as he waited for a train in the Newark station of the Pennsylvania Railroad.

Mosquitoes swarmed through the waiting room in such numbers that the walls could scarcely be seen. Agonized humans waiting for trains slapped constantly as the little winged monsters swooped down to attack any exposed skin (and if they couldn't find exposed skin, they bored right through shirts and thin blouses). Only arriving trains rescued defenseless humans from their torture.

Dr. Headlee knew where those vicious tormentors originated — out in the water-logged Jersey Meadows to the east. Years later (1945) in his book, "Mosquitoes in New Jersey," he recalled the blood-letting of bygone days. While far too scientific to utter so much as a dignified "praise be," he made it clear that life within 15 miles of the Jersey Meadows is bearable every summer only because of mosquito control.

That was all too true. So true that

this unqualified statement is not out of line: Without unrelenting mosquito control, full use of the meadowland would be impossible.

FEW workers are less appreciated than the small band of 50 or so mosquito fighters who carry on unrelenting warfare against an implacable meadowland foe. The mosquito can never be eliminated—that is certain—

Mosquito control is vital in any hopes for full use of the meadows. This article, fifth in a series, deals with modern mosquito control measures—and offers a glimpse at what summertime life might be like without mosquito warfare.

but if mosquito control measures were eliminated for one year so many billions of mosquitoes would swarm upland from the meadows that taxpayers would beg for mercy.

One year without control and most of Hudson, Essex, Union and Bergen counties would be back to pre-control days:

• When shopkeepers in Newark and Jersey City swept piles of dead mos-

quitos from their store windows on summer mornings.

• When people dared not venture near the meadows without wrapping legs and arms in newspapers and covering their faces to keep from inhaling the insects.

• When factories in or near the meadows sometimes shut down for three or four days at the height of a mosquito invasion.

• When anyone lost in the meadows would be so mosquito bitten after a single day and night that he might not survive.

Thus, when vision-filled engineers, planners and financiers sit down to carve up the meadowlands of the future they exclude the mosquito man only at the possible complete risk of their schemes. That's how vital is the anti-mosquito force—whose work comes into public awareness only on the rare occasions when a brood of stingers escapes the marshes and sets off with blood in the eye to attack the pleasant suburban hill towns.

MOSQUITO control verges on the incredible, as viewed by someone meeting it intimately for the first time. Each year millions of feet of drainage ditches are kept clear. Each

year thousands of feet of dikes are patrolled and maintained against muskrats and flood tides. Each summer billions—literally billions—of mosquitoes are eliminated by DDT sprays. How much human blood is saved no one could even guess; how much disease is eliminated by killing mosquitoes bred in sewage-polluted waters can't be computed.

THIS is modern warfare, too. Helicopters have been used to spray inaccessible portions of the Newark meadows. The Bergen County Mosquito Commission last summer bought three airboats to skim across the huge area of flooded meadows in North Arlington and Lyndhurst. Hudson County also uses airboats in battling the mosquito. Everywhere tractors and machine pumps and mechanized equipment battle the brooding enemy.

Vernon Conant, supervisor of mosquito control in Bergen, last fall invited me to ride an airboat on an inspection cruise, "to get the feel" of the work. The airboat he selected drew not more than three or four inches of water; an airplane propeller in the rear pushed the boat, almost lifting it through the foxtails. We could move anywhere in less than six inches of water.



Front-line trenches in war against mosquitoes are millions of feet of drainage ditches which

make jigsaw of much of meadowland. Air photo shows ditches draining into Berry's Creek.

Al Frenzel, our "pilot," headed the speeding boat directly at a seemingly solid wall of towering foxtails in the flooded meadows east of Lyndhurst. The prow struck the foxtails at more than 30 miles an hour, ripping a pathway through the crisply dry growth. We were surrounded on all sides by dense meadowland growth, whipped into furious lashing by the rear-end propeller. Mr. Frenzel took it all matter-of-factly.

"WE cut through this way to find the larvae on the water," he said, simply. "Then we come back and spray" (spraying equipment is on the boat).

Our mission this time was not mosquito control, but it was exciting. As we roared out of the foxtails to a wet mosquito paradise near a dump, a black duck soared out of the grass toward the sun. Off at the dump, hundreds of alerted herring gulls left their feeding ground and darkened the sky as our skimming craft approached.

Harold Struckman, Mr. Conant's assistant, who is in charge of the boats, said this fall ride was as pleasant as could be. "You ought to be here in the summertime when we are out spraying," he said.

NO SOUTHERN HOSPITALITY IN N.J.

Read the woes of an 18th century traveler on the Jersey Meadows and never again feel too victimized by meadowland mosquitoes.

The visitor, Thomas Fairfax, en route home to Virginia after a visit to Salem, Mass., crossed the meadows in 1799. His diary was bitter:

"My horse and I were covered with myriads of mosquitoes. In vain the poor animal shook his head, brushed his tail, exerted the muscular motion of his skin. Each mosquito hung on until he had extracted his quantum of blood."

That called for more detail. He supplied it: "That's when the foxtails are alive with green aphids. The boat sweeps them off and you come off the meadows looking like the Green Hornet. I've seen them an inch thick on the windshield."

We explored deep into the broad

Squire Fairfax did some figuring. Four hundred mosquitoes found lunching room at once, he estimated. Each mosquito took a drop a minute. Sixty drops made a teaspoon. Twelve teaspoons made an ounce. Why, concluded the Virginian mathematician, his poor horse lost 30 ounces of blood on the one-hour trip! No wonder, wrote Mr. Fairfax, local farmers could not keep their horses fat; it wasn't lack of food, "but actual loss of blood."

The Virginian stayed two nights in a Newark inn—not, he assured posterity in writing, "because of any attraction." The reason: "My horse was jaded."

flooded area in the airboat, reaching spots where man does not dare to tread. Our ability to reach spots distant from dry land emphasized that this flooded marsh is no sweet lake.

A fetid, sulphuric odor, somewhat like rotten eggs or a high school chemistry lab after the teacher steps out

for 15 minutes, steams up from the surface. Debris floats everywhere: boxes, mattresses, industrial wastes, tin cans, sodden cardboard boxes. The day we slid across the wasteland huge chunks of white insulating board floated on the surface, looking like miniature icebergs.

POLLUTION, always on the increase, compounds the job of the mosquito commissions. For one thing, mosquitoes breed far more rapidly in polluted waters. More important, to the men in the field, raw sewage draining into the meadows makes the job of keeping ditches open and tide gates clear a thing of nauseating unpleasantness.

Recently a mosquito superintendent complained to a high county official about the necessity of making his men work in sewage-clogged waters. "What's the matter, you boys getting soft all of a sudden?" the official asked. "You've been wading in it for 40 years. Don't start crying now."

Thus, the fight is not alone against the mosquitoes. The men who stand between mosquitoes and humans also struggle against a continuing public

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Taking Sting Out of Meadows



Special, wide planks are attached to tractor treads to prevent it from bogging down in marsh as constant spraying goes on.



Modern machine chews new ditch. RIGHT: Old-time workers with "Manahan Spade," 10" shovel used widely in early days.



Mosquito control still requires manual labor. Here, worker in Elizabeth meadows wields machete to trim foxtails near ditch.

MOSQUITOES

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apathy (relieved only negatively when a few million mosquitoes get away).

SUCH casual regard of mosquito control is nothing new. Dr. John B. Smith, the Rutgers professor who awoke the state to the mosquito peril a half century ago, usually found human indifference—or outright opposition—harder to overcome than the winged stingers of the marshes.

Everyone knew of the meadowland mosquitoes. Early travelers wrote scornfully of the pest-ridden marshes between Jersey City and Newark. Nineteenth century developers found themselves plagued by mosquitoes. Horses and cattle suffered cruelly from flank attacks. Every serious study of the meadows warned that mosquitoes must be overcome if reclamation were to come.

Then, in 1901, Dr. Smith set off determinedly after the mosquito. That year he wrote: "I see no reason why, inside a decade, New Jersey mosquitoes should not be reduced to such a point as to be practically unnoticed."

Dr. Smith appealed to the legislature. Ridicule burst over him. The law makers guffawed. Why, New Jersey was famous for her mosquitoes! Newspapers carried cartoons of the serious Rutgers professor, an ideal subject for the cartoonist's pen because of his hair carefully parted in the middle, his pince-nez glasses and his full, pointed beard.

RIDICULE left Dr. Smith unperturbed. He waited on the legislators, got them to pass a bill authorizing a complete study of mosquitoes and control measures. The bill authorized \$10,000, but, in good New Jersey tradition, didn't include the money in appropriation measures.

Within two years, however, Dr. Smith's crews had cut 360,000 feet of ditches through the Newark meadows and by 1905 he had published his monumental 482-page report on "The Mosquitoes Occurring Within the State," a work which still has great validity after all these years. Above all, Dr. Smith demonstrated that mosquitoes bred only in water—a notion contrary to popular fancy—and proved the need for drainage ditches.

The bustling Rutgers mosquito fighter pushed for a bill authorizing county mosquito commissions, saw it passed by the Senate and Assembly, but, sadly, died nine days before Gov. Woodrow Wilson signed the measure into law in 1912.

Dr. Headlee succeeded Dr. Smith and energetically pushed meadowland mosquito control work in cooperation with Bergen, Hudson, Essex, Union and Middlesex County mosquito commissions. By 1914—the year he told of mosquitoes invading the Pennsylvania Railroad station—millions of feet of ditches were draining the soupy lands of the five counties. Union County alone had 690,000 feet of ditches in 1914.

THAT network of mosquito ditches still operates. Anyone flying over the 30,000 acres of Jersey Meadows is struck by the long lines of ditches slicing the meadows into what seem to be straight-sided pieces of a jigsaw puzzle. These are literally the front-line trenches in mosquito warfare.

Today machines dig new ditches where needed or keep old ditches in condition. They cut deep, wide openings, seemingly without effort. However, nearly all of the original ditches were dug by hand, to the vivid enhancement of memories of veterans in the mosquito commissions.

Frank Russo, chief inspector of the Elizabeth meadows for the Union County Mosquito Commission, can't even guess how many thousands of feet of ditching he dug himself after he began work in 1923.

Each day, six days a week, Frank went down to the marshes. Each day he wielded the "Manahan spade" (named for its inventor). That spade, 10 inches wide, 30 inches deep and 40 pounds heavy, knifed through the sod. Ditches were 60 inches deep and anywhere from 10 to 40 inches wide. Figure for yourself the man-hours and muscle fatigue involved in digging a ditch 3,500 feet long, 40 inches wide and 5 feet deep.

"We really worked," recalls Frank. "All day long, from 7 a.m. to 5 p.m., we dug—always fast enough to keep the water from catching up."

FRANK will never forget the "mosquito digger's chant," sung in unison when anyone groaned about the work:

*"Bend your knees, straighten out,
Something's got to give.
It's either the sod or your back,
See which one will live."*

Ditches came to be known by the width of the Manahan spade; to this day mosquito men speak always of "a 20" or "a 40" when they describe a particular ditch (a "20," of course, being two spades wide).

Sometimes the naive notion gets about that if the meadows are to be reclaimed, then a trip must be made to Holland to learn about dikes and pumping operations. Dikes can be seen much closer to home: right out in the Jersey Meadows are thousands of feet of dikes, built and maintained by mosquito commissions in Bergen, Hudson, Essex and Union counties. There are no picturesque windmills, but the modern pumps do a good workmanlike job of keeping the diked meadows dry. These unglamorous pumps are better than most windmills: They pull up to 15,000 gallons of water a minute off the marshes.

BEHIND the dikes, where ditches bring water to the pumps, the meadows are quite dry. Dryness robs the mosquito of breeding spots, and, if the hungry little "killyfish" gets to swim through the ditches, he eats larvae faster than the busy mosquitoes can produce them. The "killy" is better than DDT when he sees larvae on the bill of fare.

Mosquito troubles come not in diked and ditched meadow but in

areas which flood and then do not drain properly. Eggs are laid in these undrained spots, little stingers hatch and off they go. Spraying is the only effective weapon, and modern DDT sprays work wonders in killing the larvae before they hatch.

When a dike breaks, trouble follows—and the trouble is far greater if the dike has had a long history, because the longer the dikes have been fending off the tides the more the meadows behind have shrunk. When these get flooded, water is extremely difficult to remove.

Such a flooded area is the big open space in southern Bergen County. Dikes had enclosed this, more or less regularly, since the "iron dikes" were installed shortly after the Civil War. Then, in 1950, a hurricane tide broke the dikes and water surged across the badly shrunk areas. Today the area is a flooded lakeland interspersed with huge patches of thick foxtails. Mosquito control is a terrific problem.

In contrast, just north of this a broad area of about 1,500 acres is dry behind Bergen County dikes. Houses here have edged up close to the swamp, even out on reclaimed areas of the meadows in several towns. The houses, rather than mosquitoes, are why these dikes are maintained at all costs. As one mosquito man puts it:

"A flooded cellar is more dramatic than a flooded marsh. If there were houses on the meadows in North Arlington we would have the dike back."

PARADOXICALLY, along with water, fire is a constant worry of the mosquito commissions.

Meadows fires are savage. The tall foxtails and the shorter cattails become as dry as tinder in fall and remain that way until green growth replaces them in late spring. Fire whips through the dried growth with explosive force, jumping creeks, wide ditches, dikes, anything. The flames sweep across wooden bridges and catwalks built to take mosquito equipment out on the marshes. Sometimes the peat in the dikes takes fire and the dikes literally burn.

Everything disappears. Robert Helm, Union County mosquito superintendent, told me of a group of engineers on the meadows a few years ago. One of them apparently dropped a cigarette into the dry grass. Instantly a roaring blaze swept across the meadows, destroying within minutes the engineers' jeep, equipment, everything. Only the fact that the wind fanned the fire away from the engineers saved their lives.

Fire in the dried shrunk meadows behind the dikes is especially disastrous to mosquito control. The surface peat becomes ignited, quickly burns underground and can smoulder for weeks in a hot dry spell. It takes a long, soaking rain to quench the flames. The peat fires burn large, deep pits and in these water collects. Mosquitoes breed in these fire-made pools, usually in places inaccessible to spraying equipment and beyond the range of drainage ditches.

Fire departments generally are pow-

erless against meadows fires; they just can't get trucks across the roadless marshes. Actually, when it comes to traversing the meadows, no one tackles the job as fearlessly or as well as the mosquito commissions.

MOSQUITO hunters go nearly everywhere and consequently it is they who know the meadows best. Anyone who feels the urge to understand the meadows finds time best spent in cultivating the mosquito men. People

Tortured Slaves

W. Woodford Clayton, in his "History of Bergen and Passaic Counties" (1882) said that in the summer months mosquitoes on the Jersey Meadows were "generated by myriads and it is as much as a person's life is worth to pass through them after dark."

Worse, Mr. Clayton recorded stories of the days when the swamps were used to torture delinquent slaves. Bergen slave masters made Simon Legree seem Simon pure: They didn't whip the slaves; they sent them out into the meadows, shackled and handcuffed, to spend the night with the mosquitoes.

Many slaves died from a single night's exposure, "their bodies swollen enormously from mosquito bites."

such as Vernon Conant and Frank Russo can lead an explorer to places which most people don't even suspect in this sprawling marshland in the heart of the world's most heavily populated metropolis.

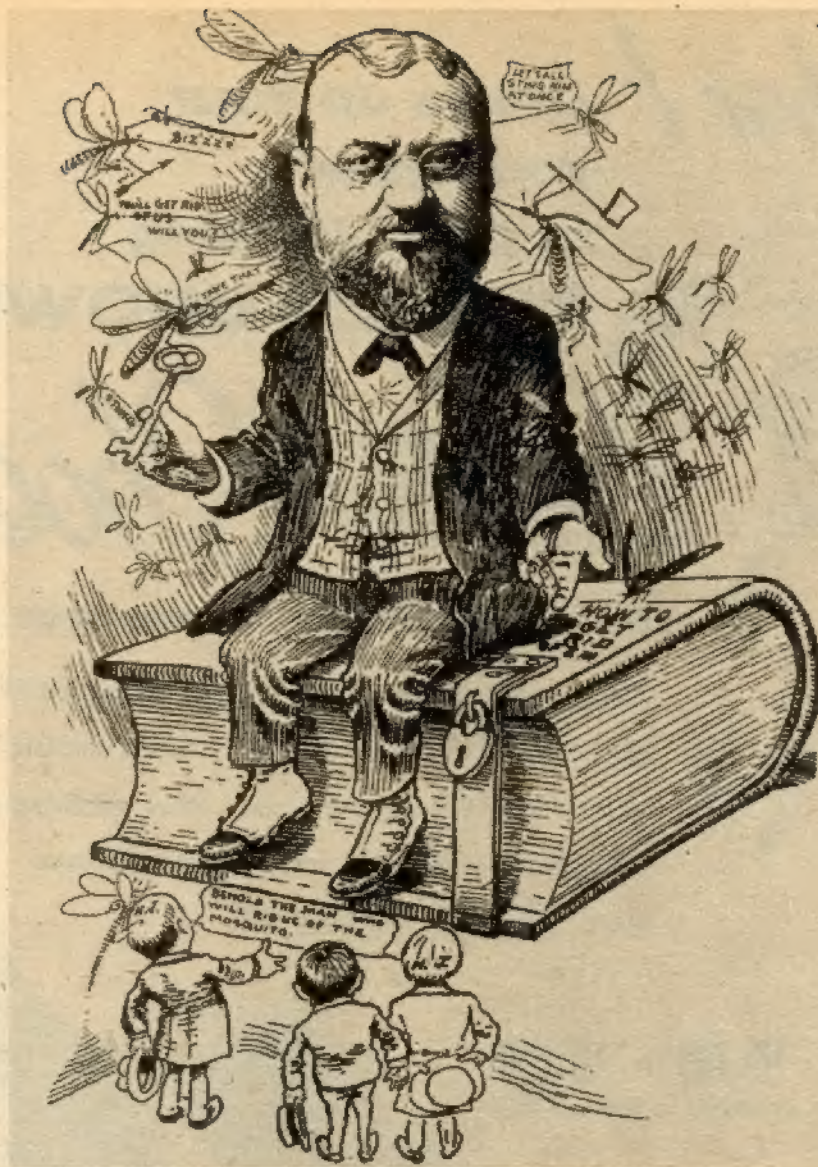
They'll talk about the breeds of mosquitoes which are troublesome—and make it clear that often when the Jersey Meadows get blamed for a spate of upland blood letting, the fault is not in meadowland failure at all. Usually complaints of "meadows mosquitoes" in the suburbs lead investigators to back-yard bird baths or swimming pools or fish ponds left untended for a month while owners are on vacation. Mosquitoes love such spots every bit as much as a marsh land.

Equally, however, such mosquito men as Messrs. Conant and Russo and a half dozen other true veterans manifest a continuing curiosity in this meadowland which has occupied so much of their time and effort for 30 to 35 years each. The thought grows that they love this area—enough to talk about mosquitoes, muskrats, "characters," dikes, fires, the "old days," or anything in which a visitor expresses interest over and above mosquitoes.

Nevertheless, they defend their work mightily, and with good reason. Say it once, say it again: Without constant mosquito control in the meadows, just plain forget about widespread reclamation.

And—fix the screens.

(Next week: Transportation Network)



Cartoonist's conception of Dr. John B. Smith, Rutgers professor who was ridiculed for his attempts at the turn of the century to awaken state to mosquito peril. **BELOW:** Latest concept of his program, helicopter spreads DDT, the only effective weapon.

